

Claims

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- i. Recording system (84) for recording vehicles (72) with a position determining system (74), for example a satellite navigation system or bearing taking system, when using roads, with the features:

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- (a) means (76) for permitting a vehicle to transmit its received coordinate signal (78) to the recording system (84),

- (b) the recording system (84) comprising a computer unit;

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- (c) a digital road map (86) being stored in a memory of the computer unit

- (d) selected roads (10) of the road map being subdivided into appropriate sections (26,28,30,32,34);

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- (e) each section (26,28,30,32,34), in turn, being subdivided into digital rectangular segments (36,38,40,42,44),

- (f) means for associating the coordinates of the respective detected vehicle (72) with the rectangular segments (36,38,40,42,44),

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- (g) each section (26,28,30,32,34) of the rectangular sections having an appropriately selected length (46) of the rectangular segments (36,38,40,42,44);

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- (h) the rectangular segments (36,38,40,42,44) overlying the course of the road.

characterized in that

- (i) for each section (26,28,30,32,34), a respective appropriately selected width (48) of the rectangular segments (36,38,40,44) is provided.
2. Recording system (84) for recording vehicles (72) with a position determining system (74), for example a satellite navigation system or bearing taking system, when using roads, as claimed in claim 1, characterized in that the sections (26,28,30,32,34) have different lengths (46).
3. Recording system (84) for recording vehicles (72) with a position determining system (74), for example a satellite navigation system or bearing taking system, when using roads, as claimed in anyone of the claims 1 or 2, characterized in that the selected roads are toll roads, such as highways (10).
4. Recording system (84) for recording vehicles (72) with a position determining system (74), for example a satellite navigation system or bearing taking system, when using roads, as claimed in claim 3, characterized in that the sections (26,28,30,32,34) extend from exit (16,18) to exit (16,18).
5. Recording system (84) for recording vehicles (72) with a position determining system (74), for example a satellite navigation system or bearing taking system, when using roads, as claimed in anyone of the claims 1 to 4, characterized in that means are provided for activating the recording of the vehicle (72) not before the coordinate signal (78) enters a rectangular segment (36,38,40,42,44).
6. Recording system (84) for recording vehicles (72) with a position determining system (74), for example a satellite navigation system or bearing taking system, when using roads, as claimed in anyone of the claims 1 to 5, characterized in that means are provided for de-activating the Recording of the vehicle (72) upon the coordinate signal (78) leaving a rectangular segment (36,38,40,42,44).
7. Recording system (84) for recording vehicles (72) with a position determining system (74), for example a satellite navigation system or bearing taking system, when using roads, as claimed in anyone of the claims 1 to 6, characterized by

identifying means for transmitting an identifying signal (80) to the recording system (84) for unambiguous identification of a detected vehicle (72).

- 5 8. Recording system (84) for recording vehicles (72) with a position determining system (74), for example a satellite navigation system or bearing taking system, when using roads, as claimed in anyone of the claims 1 to 7, **characterized in that** means are provided for associating toll (90) with the detected vehicle (72).
- 10 9. Recording system (84) for recording vehicles (72) with a position determining system (74), for example a satellite navigation system or bearing taking system, when using roads, as claimed in anyone of the claims 1 to 8, **characterized in that** means are provided for determining the entrance and/or exit angle at which a vehicle (72) enters or leaves a rectangular segment (36,38,40,44).
- 15 10. Recording system (84) for recording vehicles (72) with a position determining system (74), for example a satellite navigation system or bearing taking system, when using roads, as claimed in anyone of the claims 1 to 9, **characterized by** means for optimizing or reducing, respectively, the data quantities, in particular of the road data, of the section data (26,28,30,32,34) and of the data of the rectangular segments (36,38,40,42,44).

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- 25 11. Recording system (84) for recording vehicles (72) with a position determining system (74), for example a satellite navigation system or bearing taking system, when using roads, as claimed in anyone of the claims 1 to 10, **characterized in that** the digital road map (86) is provided in the form of vector data.
- 30 12. Recording system (84) for recording vehicles (72) with a position determining system (74), for example a satellite navigation system or bearing taking system, when using roads, as claimed in anyone of the claims 1 to 11, **characterized in that** means are provided for fixing a tolerance range within which activation and de-activation of the recording of the vehicle (72) takes place.

13. Method of recording vehicles with a position determining system (74), such as satellite navigation system (GPS), when using roads (10), with the following steps:

- (a) transmitting the received coordinate signal (78) to a recording system (84) with a computer unit, the memory of which has stored therein a digital road map (86),
- (b) subdividing selected roads (10) of the road map (86) into appropriate sections (26,28,30,32,34),
- (c) subdividing each section (26,28,30,32,34), in turn, into digital rectangular segments (36,38,40,42,44),
- (d) associating the coordinates (78) of the respective detected vehicle (72) with the rectangular segments (36,38,40,42,44),
- (e) assigning to each section (26,28,30,34) an appropriate length (46) for the rectangular segments (36,38,40,42,44);
- (f) superimposing the rectangular segments (36,38,40,42,44) to the course of the road (10),

characterized in that

- (g) an appropriately selected width (48) for the rectangular segments (36,38,40,44) is assigned to each section (26,28,30,32,34).

14. Method of recording vehicles (72) with a position determining system (74), when using roads (10), as claimed in claim 13, characterized in that an appropriately selected length is assigned to the sections (26,28,30,32,34), these length being possibly different.

15. Method of recording vehicles (72) with a position determining system (74), when using roads (10), as claimed in anyone of the claims 13 or 14, characterized in that toll roads (10) are selected as relevant roads.
- 5 16. Method of recording vehicles (72) with a position determining system (74), when using roads (10), as claimed in claim 15, characterized in that subdivision of the roads in sections (26,28,30,32,24) is effected, in the case of highways or highway-like roads, from exit (16,18) to exit (16,18).
- 10 17. Method of recording vehicles (72) with a position determining system (74), when using roads (10), as claimed in anyone of the claims 13 to 16, characterized in that recording of the vehicle (72) is not activated before the coordinate signal (78) enters a rectangular segment (36,38,40,42,44).
- 15 18. Method of recording vehicles (72) with a position determining system (74), when using roads (10), as claimed in anyone of the claims 13 to 17, characterized in that recording of the vehicle (72) is deactivated upon the coordinate signal (78) leaving a rectangular segment (36,38,40,42,44).
- 20 19. Method of recording vehicles (72) with a position determining system (74), when using roads (10), as claimed in anyone of the claims 13 to 18, characterized in that an identification signal (80) for unambiguously identifying a recorded vehicle (72) is transmitted to the recording system.
- 25 20. Method of recording vehicles (72) with a position determining system (74), when using roads (10), as claimed in anyone of the claims 13 to 19, characterized in that toll is associated with a detected vehicle (72).
- 30 21. Method of recording vehicles (72) with a position determining system (74), when using roads (10), as claimed in anyone of the claims 13 to 20, characterized in that the entrance angle and/or the exit angle at which a vehicle enters or leaves, respectively, a rectangular segment (36,38,40,42,44), is determined.

22. Method of recording vehicles (72) with a position determining system (74), when using roads (10), as claimed in anyone of the claims 13 to 21, characterized in that a data optimization or data reduction, respectively, in particular of the road data, the section data and the data of the rectangular segments (36,38,40,42,44) takes place.
23. Method of recording vehicles (72) with a position determining system (74), when using roads (10), as claimed in anyone of the claims 13 to 22, characterized in that the digital road map (86) is stored in the memory of the computer unit as vector data.
24. Method of recording vehicles (72) with a position determining system (74), when using roads (10), as claimed in anyone of the claims 13 to 23, characterized in that a tolerance range is fixed in which activation and de-activation, respectively, of the recording of a vehicle is effected.